Space Weather Forecast

Issued on Sunday 2 February 2025 at 01:25 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of G1 Minor Storms Day 1 (01 Feb) with fast solar winds and a potential CME glance. Further Moderate expected.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate solar activity over the last 24 hours, with one Moderate flare at 01/1319 UTC from AR3977. There are eight active regions on the Earth-facing disc. The majority of the activity is from the cluster of sunspots in the northeast, consisting of AR3976, AR3977 and AR3978. These form a complex area of multiple active regions, with signs of magnetic interaction between the regions suggesting the ongoing potential for notable flares. There are a number of small and simpler regions across the rest of the disc, however any growth of these remains generally limited.

A coronal mass ejection (CME) was observed leaving the Sun associated with the M2.4 flare from the northeast disc. Analysis of this event suggests a likely miss behind and to the north of Earth. A second, multipart CME left the Sun at a similar time from the region of AR3979 in the southwest, early analysis of this events suggests a miss ahead of Earths orbit.

Solar Wind / Geomagnetic Activity: Solar winds showed the onset of a connection to a faster solar wind stream. Wind speeds were initially slightly elevated around 400km/s, rising slowly to current strong levels around 680km/s. The Interplanetary Magnetic Field, Bt, initially moderate to strong, but has steadily declined to current weak levels. The north-south component, Bz, initially moderately variable, but variation steadily reducing to become weak. Geomagnetic activity was Unsettled to Active (Kp 3-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Generally Moderate activity is expected, with Moderate flares expected at times and a slight chance of isolated Strong flares, primarily from the regions on the northeast disc.

Solar Wind / Geomagnetic Activity: There is one CME in the forecast, which could give a glance on Day 1 (02 Feb). There is uncertainty in the possible geomagnetic response to this - it is most likely to be a glancing blow with little significant effect, but with potential for something stronger. Earth is currently connecting to fast solar winds, and speeds around 600-700km/s. Wind speeds

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expected to gradually ease during Days 2 and 3 (03-04 Feb), returning to generally slightly elevated levels by Day 4 (05 Feb).

Unsettled to Active geomagnetic activity is expected, with a chance of G1/Minor storms on Day 1 (02 Feb), and a slight chance of a G2/Moderate Storm interval. There is a very slight chance of G3/Strong storms should any CME be more geoeffective. Activity then expected to ease during Days 2-3 (03-04 Feb) to become generally Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to remain at background levels. However, there is a slightly increasing risk of a rise through this period, as the complex of sunspots in the northeast disc move towards the western hemisphere.

Geomagnetic Storms

Geomagnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	20	5	5
Strong	G3	No	10	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 (M Class)	Yes	75	75	75	75
Very Active	R3-R5 (X Class)	No	15	15	15	15

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	10	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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